

**FREQUENCY DISCRIMINATOR USING REPLICA COMPENSATED  
DELAY LINES AND METHOD OF OPERATION**

**ABSTRACT OF THE DISCLOSURE**

5           A frequency discriminator for detecting phase shifts between sequential pulses in a frequency-shift keyed (FSK) signal having a nominal frequency,  $f$ . The frequency discriminator comprises: 1) a first current controlled delay line for receiving the FSK signal and delaying the FSK signal by a desired time delay to  
10           thereby produce a time-delayed FSK signal; 2) a multiplier for receiving and multiplying the FSK signal and the time-delayed FSK signal to thereby produce an output product signal proportional to a phase shift between said FSK signal and said time-delayed FSK signal; and 3) a delay locked loop comprising a second  
15           current controlled delay line substantially similar to the first current controlled delay line. The delay locked loop receives a reference clock signal having a time period equal to the desired time delay and adjusts a control current level in the second current controlled delay line until a delay of the second current  
20           controlled delay line matches the time period of the reference clock signal. The control current level is then used to adjust a delay of the first current controlled delay line.